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Capitation care fee banding and the reliability of an on-line tool.

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Background

Zickert et al¹ (2000) after conducting a study on the use of a risk based capitation plan to care for adult patients in a Swedish public dental services clinic concluded:

'The capitation model of care stimulated both dentists and patients to apply existing preventive knowledge'

They found that 98% of the patients who were surveyed (based on more than 750 responses) after participating in the trial preferred the capitation model to fee per item models. In this trial three fee bands were used (High risk, medium risk, low risk).

Lennon et al² (1990) also concluded, after a trial in the UK to compare capitation payments for the care of children with a fee per item system, that capitation offered dentist more clinical freedom, which resulted in the provision of more preventive care.

In the USA Rosen et al³ (1977) had drawn similar conclusions from studying the care patterns of patients in capitation versus patients in fee per item contracts being cared for by the same clinician.

Capitation systems have their critics, but it has become widely accepted that they are capable of producing optimal conditions for an effective preventive approach by both clinicians and patients.

In the United Kingdom dentists are mandated to take a preventive approach by General Dental Council Standards⁴. Standard 4.1 states:

*'You **must** take a holistic and preventative approach to patient care which is appropriate to the individual patient.'*

The Steele Review of NHS dental services in England⁵ (2009) supported a significant role for capitation funding to encourage a preventive approach, with fees weighted to allow for 'practice profiles'. They suggested that as many as 10 bands of patient charges might be needed. These ideas are still being piloted at the time of writing.

In theory capitation care fees could simply be set at the same level for all patients.

This theory would be underpinned by the 'swings and roundabouts' hypothesis whereby practitioners would have good financial outcomes for patients with low need and that would offset the poor financial outcomes resulting from caring for high need patients. A very simple theory which would be unlikely, in the opinion of the authors, to work well in practice because:

- 1) Practitioners would be incentivised to provide care for low needs patients over those with high needs. There would not be a financial incentive to care comprehensively for high needs patients.
- 2) If patients were paying their own fees, or contributing to them proportionately, lower needs patients would be discouraged to 'register' for care. There would be no financial incentive for patients to lower their risk.

It therefore follows that most models of capitation funding have sought to categorise patients into fee bands according to an assessed likely ongoing need for care. A less diverse 'swings and roundabouts' philosophy still needs to be accepted within the fee bands in such a capitation system. The more bands that are accurately employed the less that this will be so. The authors would suggest that in an effective capitation system each band is ascribed with a notional annual care time allowance for a typical

patient assigned to it based on the assessment protocol. This supports the fee setting process.

Denplan Care in the United Kingdom is a banded capitation system which has now been in operation in the private sector for more than 30 years. Around 1.1 million patients are registered in Denplan Care. From the outset in 1987 Denplan Care has used five fee bands (A-E). Patients have traditionally been banded primarily according to the quantity of restorative care evident in their dentition, and their periodontal condition. The gradient goes from patients assessed as low needs in group A, through to those in group E who are likely to have considerable ongoing need for care.

Denplan, for the last thirty years, has recommended that patients are accepted for capitation care at a point at which they could be considered to be 'dentally fit'. So, patients are not usually accepted into the programme while in need of any professional oral health care interventions in the short term. However, the programme recognises that ongoing care needs will vary considerably, even from some rather arbitrary point at which the patient is relatively stable.

Each individual practitioner is able to set the fee charged for each band according to their practice costs and to review these fees annually. These practice costs will take into account the skill mix utilised in the practice to provide patient care. Practitioners are recommended to review each patient's fee banding periodically. The ultimate decision on the fee banding of any patient is at the discretion of the practitioner. The fee banding protocols are offered for guidance.

Five years ago in partnership with Oral Health Innovations Ltd (the UK licence holders of PreViser technology), Denplan launched an on line patient assessment

tool, the Denplan PreViser Patient Assessment (DEPPA). Busby et al⁶ (2013) described the development of DEPPA's three elements:

- 1) The Oral Health Score which measures the patient's oral health status.

Perfect oral health is marked with a score of 100. Six aspects of oral health contribute to this composite score:

✓ Patient perceptions (comfort, function and appearance) max score	24
✓ Soft tissues max score	8
✓ Occlusion max score	8
✓ Tooth wear max score	12
✓ Tooth health max score	24
✓ Periodontal health max score	24

- 2) The PreViser future disease risk scores which measure the patient's risk for caries, periodontal disease, tooth wear and oral cancer. For each condition the scoring is:

Very low risk	1
Low risk	2
Moderate risk	3
High risk	4
Very high risk	5

- 3) A new calculation of the indicative Denplan Care fee band (A-E)

This revised fee band calculation gave a higher weighting to periodontal disease severity than the traditional protocol and introduced weighting for future disease risk based on the PreViser risk scores. The tables in figure 1 summarise the points system used by DEPPA to recommend fee categories.

The use of DEPPA is voluntary for Denplan members. Nevertheless, since 2012 more than 100,000 patient assessments have been completed. These data and are held in encrypted format so that only the treating practice can identify individual patients. However it is available for anonymous population studies. The aim of this paper is to investigate the reliability of the DEPPA fee code guidance through a population study and to discuss some of the practicalities of effective capitation funding.

Figure 1 – A summary of the points system used for fee code guidance in DEPPA

Restorative status points

Tooth with simple restoration	1
Tooth with complex restoration	2
Root filled tooth	2
Tooth with crown post	2
Removable prosthetic tooth	1
Fixed prosthetic tooth	2

Periodontal status points

Severe periodontal disease	35
Moderate periodontal disease	20
Mild periodontal disease	10
Gingivitis only	5
Healthy	0

Future disease risk points for each of caries, periodontal disease, wear and oral cancer

Very high risk	5
High risk	4
Moderate risk	3
Low risk	2
Very low risk	1

The points are totalled to give a fee code recommendation as follows:

Band	A	B	C	D	E
Points	0-14	15-34	35-60	61-81	82 and above

Methods

A form of 'test- re-test' reliability analysis was conducted on the DEPPA data base. The fee code spread for the first 10,000 patients assessed using DEPPA was compared with the most recent 10,000 patients assessed. The hypothesis was that, if these two populations, on average, have a similar oral health status it would be expected that the fee code spread should remain in a similar proportion for the two populations.

The data base was also interrogated to compare average oral health scores for patients in each of the five bands. The hypothesis was that the average oral health score should ideally be seen to fall in an approximate linear fashion from the lowest need group (A) through to the highest need group (E).

The average value of three aspects of the oral health score was analysed for each band. The three aspects analysed were periodontal health, tooth health and patient perceptions which make up 72% of the total OHS and could be held to be the best indicators of likely practice workloads. From these components it was hypothesised that an indication of typical care time needs for each fee band group might demonstrate further the reliability of the fee bands.

Finally the average PreViser disease risk scores were analysed for each band for caries and periodontal disease. It was hypothesised that ideally disease risk should be seen to increase through the fee bands from low risk in category A through to significantly higher risk in category E in an approximately linear gradient.

Results

Chart 1 shows the percentage of patients in each of the five categories (A-E) from the first 10,000 patients assessed in 2013 compared with 10,000 patients assessed in 2017. The average oral health score for both groups was 78 (rounded to nearest whole number)

Chart 1

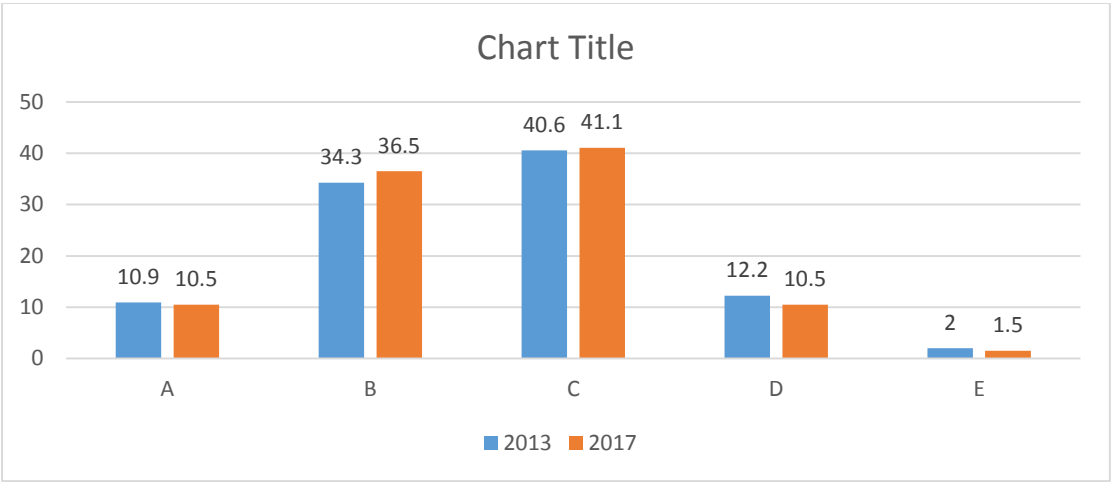


Chart 2 shows the average oral health score (rounded to the nearest whole number) for each of the 5 fee band (A-E) in the DEPPA data base

Chart 2

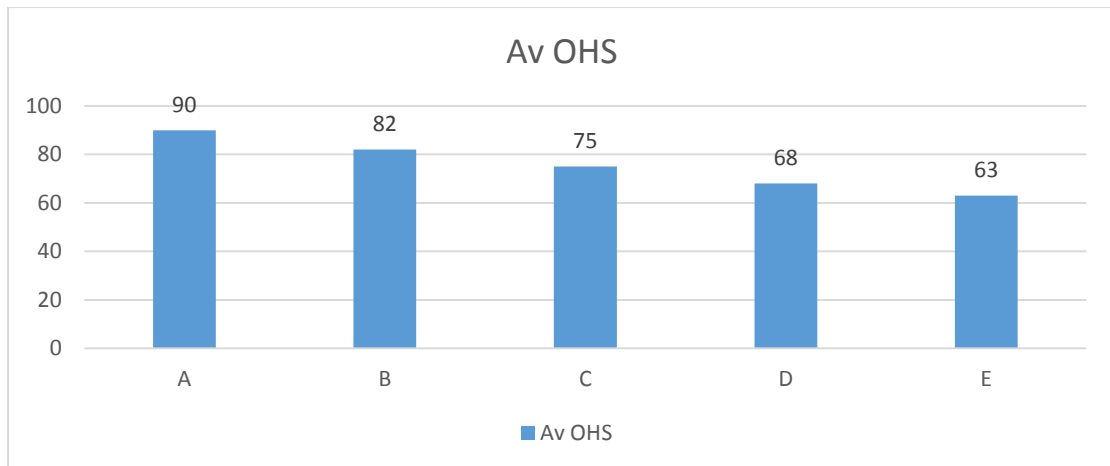


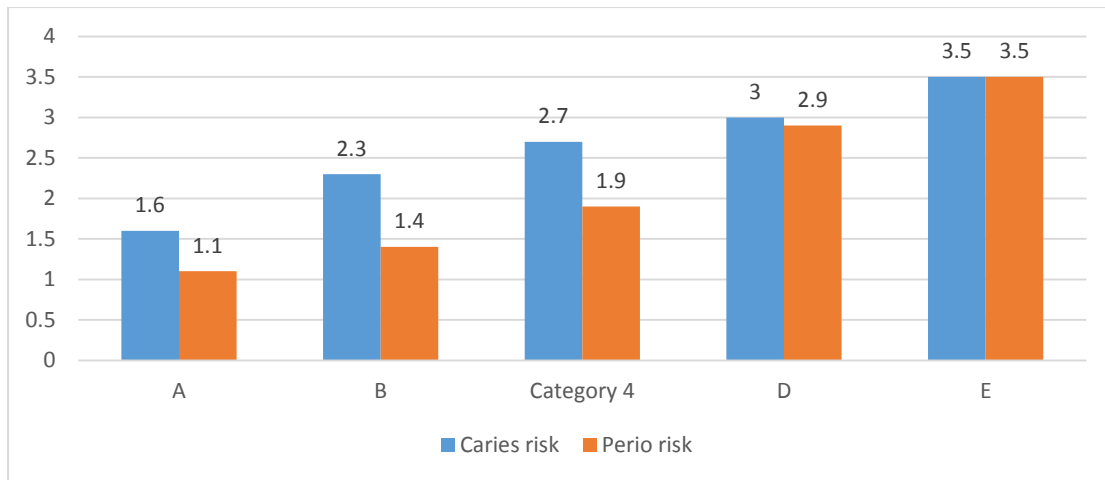
Table 1 shows the average periodontal health, tooth health and patient perception scores (rounded to the nearest whole number) for each fee band (A-E) in the DEPPA data base. Perfect health in each of these aspects is represented by a score of 24

Table 1

Aspect	A	B	C	D	E
Periodontal health	21	17	11	5	3
Tooth health	19	17	16	16	15
Patient perceptions	22	22	21	21	21

Chart 3 plots the average PreViser caries and periodontal risk scores for each of the five fee bands (A-E) taken from the DEPPA data base

Chart 3



Discussion

Capitation fee banding is never likely to be a precise science. However, Chart 1 demonstrates a consistency in the fee code recommendations between the 2013 and the 2017 samples. Both groups have the same average oral health score and therefore may be held to be exhibiting similar average oral health status. In fact some individual patients will appear in both samples, as they in in continuing care contracts and it is recommended that full DEPPAs are conducted at least every 2 years. For the 2013 sample around 200 different dentists contributed assessments to the data base. By 2017 the second sample had about 500 dentists contributing to the data. There would seem to be ongoing consistency as the user group of clinicians grows.

Chart 2 demonstrates a, more or less, linear gradient in average oral health score values from those in the lowest need fee band A (a high OHS average value of 90) through to the highest need band E (a low OHS average value of 63).

Table 1 demonstrates that the most significant contribution to this gradient is clearly periodontal health. The average periodontal health score for each band indicates that whereas many patients in group A will have close to perfect periodontal health many in group E will have severe periodontitis.

A more 'shallow' gradient on tooth health scores demonstrates some increase in the need for the restoration of teeth across the fee bands. However it will be remembered that patients enter these capitation contracts in stable oral health and so this is not so marked. The scores confirm that a typical category A patient has very few existing restorations and rarely needs restorative tooth interventions whereas a typical category E patient much more commonly needs treatment in this respect.

Chart 3 demonstrates an increasing future risk of caries and periodontal disease in a gradient through the categories. The risk based approach to preventive care logically suggests that more preventive resources should be invested in those patients at greater risk of disease. These data demonstrate how the DEPPA fee code guidance is supporting that philosophy.

These data confirm that the most significant workload variation between patients who enter Denplan Care when 'dentally fit' is the differing ongoing need for periodontal care. These DEPPA data permit an estimation of the typical care time needed for patients in each fee band. All patients will need a notional time allowance for ongoing assessment and advice although both of these aspects will increase through the categories as risk and disease experience increases. The data in table 1 allows an estimate to be made for the likely notional periodontal and tooth care needs of each fee band as the average severity of disease for each band is measured.

Finally the authors believe that patient assessment tools such as DEPPA facilitate the possibility in the future of extending the range of fee bands to include patients in less stable oral health than currently catered for. This would require the current point

weightings to be revised, particularly to accommodate patients needing more restorative interventions.

Conclusions

Reliable capitation fee banding increases the viability and fairness of this funding system which facilitates a preventive approach for both patients and dental teams. Patient assessment systems such as DEPPA can provide reliable capitation fee code guidance.

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